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(74) Agents: **FOLEY, Shawn, P.** et al.: Lerner, David, Litten-
berg, Krumholz & Mentlik, LLP, 600 South Avenue West,
Westfield, NJ 07090-1497 (US).

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(71) Applicant (*for all designated States except US*): **AD-
VANCED MICROBIAL SOLUTIONS CORPORA-
TION** [US/US]; 100 Inman Street, Cambridge, MA 02139
(US).

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(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **MURPHY, John, R.**
[US/US]; 130 Appleton Street, Boston, MA 02116 (US).
O'LEAR, Edward [US/US]; 153 Spindle Hill Road, Wol-
cott, CT 06716 (US). **HARRISON, Robert, J.** [US/US];
31 Green Street, Medfield, MA 02052 (US).

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(54) Title: **VACCINE COMPOSITIONS**

(57) Abstract: Disclosed are virulent or opportunistic prokaryotes in which metal ion-dependent gene regulation confers a growth or an infectious advantage. The prokaryote contains a DNA molecule containing a sequence encoding a dominant, metal ion-dependent repressor protein or a partially metal ion independent repressor protein. The prokaryotes are formulated into vaccine compositions and administered to a human or other animal to enhance protective immunity against infectious and diseases caused by prokaryotes in which metal ion-dependant gene regulation confers a growth or an infectious advantage.

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